

## Claims

1. A method for amplifying an optical signal, comprising the steps of:  
providing a link fiber through which said optical signal will be transmitted;  
providing a semiconductor amplified spontaneous emission source for the production of optical pumping seed;  
providing a high-power pump source such that  
light to be emitted by said high-power pump source when propagating through said link fiber together with said optical pumping seed will ensure a Raman amplification of said optical pumping seed,  
while said amplified optical pumping seed will provide Raman amplification of said optical signal in said link fiber.
2. The method for amplifying an optical signal according to claim 1, wherein the provided semiconductor amplified spontaneous emission source being optimized for Raman amplification of optical signal defined over a wide spectrum comprising the telecommunications transmission window around  $1,55\mu\text{m}$ .
3. The method for amplifying an optical signal according to claim 1, whereby providing at least a supplementary semiconductor amplified spontaneous emission source for the production of optical pumping seed to be transmitted into said link fiber for Raman amplification of optical signal defined beyond the telecommunications C-band.
4. An optical signal amplifier comprising:  
a semiconductor amplified spontaneous emission source to be optically connected to a link fiber for the production of optical pumping seed;  
a high-power pump source to be optically connected to said link fiber and having the property to emit light to be transmitted to said link fiber ensuring a

Raman amplification of said optical pumping seed when propagating through said link fiber together with said optical pumping seed, said amplified optical pumping seed being chosen to provide Raman amplification of optical signal propagating through said link fiber.

5. The optical signal amplifier according to claim 4, wherein said semiconductor amplified spontaneous emission source being a semiconductor optical amplifier.
6. The optical signal amplifier according to claim 5, wherein said semiconductor optical amplifier shows highest reflection coefficient on its back facet and lowest reflection coefficient on its opposite facet to be optically connected to said link fiber.
7. The optical signal amplifier according to claim 5, wherein said semiconductor optical amplifier being optically connected to a single optical waveguide to be further connected to said link fiber.
8. The optical signal amplifier according to claim 4, wherein said semiconductor amplified spontaneous emission source has the property to provide similar gain when providing Raman amplification in said link fiber on different polarized states of the optical signal.
9. The optical signal amplifier according to claim 4, wherein it comprises at least a supplementary semiconductor amplified spontaneous emission source to be optically connected to said link fiber and acting as source of optical pumping seed for amplification of optical signal defined beyond the telecommunications C-band.
10. The optical signal amplifier according to claim 4, wherein said high-power pump source is a Raman fiber laser adapted for a treatment of optical signal

defined at least over the telecommunications transmission window around  $1,55\mu\text{m}$ .